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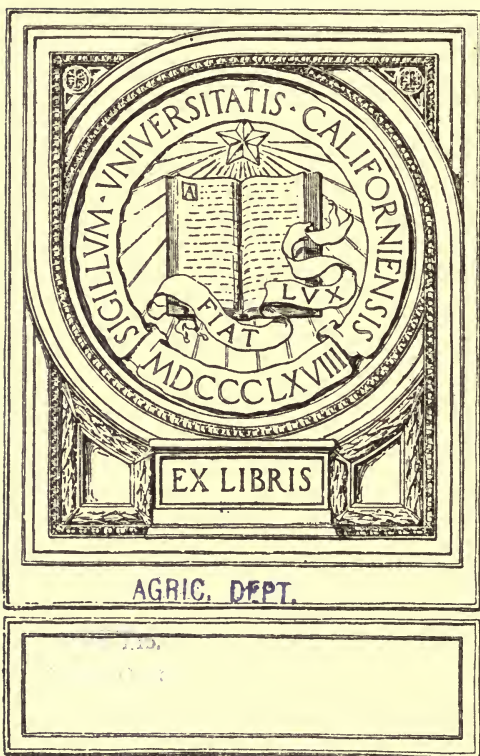
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IRRIGATION IN CALIFORNIA

HALL

1878

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SYNOPSIS OF A LECTURE

ON

IRRIGATION IN CALIFORNIA.

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THE IRRIGATION QUESTION IN CALIFORNIA.

Synopsis of a lecture delivered on this subject in the Assembly Chamber,

By WM. H. HALL, C. E.

The lecturer first drew attention to the very sad condition of affairs existing in the interior valleys in the southern half of the State, portraying the loss and suffering which had been wrought by the failure of rains during the past seasons. He spoke of the present abundant rains, but warned his hearers that so far from being an inopportune time to agitate the irrigation question, this was just the time for such discussion, for, by the time any practical good could come of it, irrigation itself would again be much needed else the climate of our State would change, which was not at all likely. We must beware of the policy of that rustic philosopher who, not wanting a roof on his house when there was no rain, did not put it on when he could, but though sorely in need of a roof when it did rain, could not put it on when he would.

The levee and reclamation questions should have been considered two years ago in order to have been prepared for the floods which are now visiting us, and now is the time to consider the irrigation question.

Of the very many efforts which have been made by farmers and land owners to inaugurate irrigation enterprises, few have passed the point where preliminary discussion ends. To most of the small number of these movements which have taken on definite form were given but short and fitful lives, and few have consummated in the construction of works to which their projectors may turn with any degree of satisfaction. In each instance of failure two causes may be assigned—the absence of method, and the lack of means.

Irrigation property is regarded with great disfavor by our capitalists for two reasons—the indefinite nature of the water privilege acquired under past and present laws respecting water rights; and the absence, under existing circumstances, of that security for adequate returns upon the investment which the law of industrial enterprise demands.

There being no definition of rights, and no overruling power to direct generally, and establish system amongst the different works and districts, we find discord wherever irrigation has dared to raise its head, and disheartening apathy everywhere else throughout the dry valleys.

He next reviewed the existing water appropriation law and its workings. Any one can take as much water as he wants at any point

he chooses. Under this law there is an entire absence of systematic apportionment; there is no knowledge of the capacity of the streams to supply water; no complete and intelligent records kept of the amount of water claimed; no official evidence of the amount of water actually appropriated; no check upon injurious interference with natural water courses; no definition or real protection of the rights of riparian owners.

Rival appropriators waste the precious hours of the irrigation seasons in wrangling over the division of the waters, generally more than enough for all, while riparian proprietors have to resort to violence or the Courts if their interests are injured in the melee. It is this state of affairs which it is necessary to put an end to by wise legislation.

The local water commission laws, of which quite a number have been passed, as applicable to various counties of the State, were next reviewed, and their workings shown to be scarcely better than that of the general water appropriation law.

In brief, these measures have failed of their purposes through the absence of general system, scientific treatment, and overruling competent authority to direct, which, from the nature of things, could only be vested in the State, and executed by a department of State Government.

The general irrigation law of eighteen hundred and seventy-two was then considered, and shown to have worked to some advantage for reclamation purposes, but not to have answered any good end for the would-be irrigator. Under it the districts could only become water appropriators; there was no general system, and no defined rights to water.

After all this legislation we find the irrigation interest in a worse condition, really, than it would be if there were no laws on the subject, and no works constructed. For now, rights have grown up which will have to be condemned, customs and ideas have taken hold amongst the people which will have to be eradicated before the irrigation problem is solved.

We find little to guide us in the formation of our policy towards the irrigation interest in the experience of India, Egypt, and Italy in this regard; but in the annals of irrigation in Spain we find much that is instructive in this connection.

In all lands where irrigation has been practiced as a general agricultural method it has become necessary to supply by government authority that system in the distribution of the waters from the streams and in the construction of works the absence of which has caused such evil effects in our irrigated sections.

Spain, particularly, found, after endeavoring to get along for years, the absolute necessity for it, and was obliged, at great expense, to correct a state of affairs which had grown up, similar to that towards which we are fast drifting: the monopolizing and wasteful use of the waters of her streams by the few, to the detriment of the general interest. The Spanish Government early tried the policy of constructing irrigation works at its own expense, but after its experience with the Royal Canals of Aragon and of Tauste, was dissatisfied with the course, and found it more advantageous to encourage the construction of such works by private and corporate enterprise. In April, eighteen hundred and sixty-one, it was announced that twelve million five hundred thousand dollars of the Royal funds

would be devoted to the encouragement of the construction of irrigation works under proper government regulations. This money was partially disbursed as subsidies to projectors of irrigation enterprises, and partially as loans to irrigators and constructors of canals. Finally, after years of consideration and investigation, the general law governing water rights and construction and maintenance of irrigation works was published in eighteen hundred and sixty-six. A synopsis of this law was given, and applications of its principles and salient features made to our condition in California. ✓

Irrigation has always been a fruitful source of litigation and an unending subject of legislation.

There are three elements which must necessarily be present to insure the commercial success of irrigation: suitable lands; water sufficient to irrigate them; population skillful and industrious to use the water to advantage. Without all of these elements present in the highest degree, irrigation may be gradually extended, but its development cannot be forced without danger of disastrous failure.

Although we have millions of acres of land which are suitable for irrigation in a high degree, there are also many hundreds of thousands of acres, if not millions, which, owing to some peculiarity of soil or configuration of surface, cannot be cultivated with profit by irrigation under any circumstances which are likely to arise for years to come.

Our water supply is abundant throughout the San Joaquin and Tulare Valleys, for instance, *ultimately* to irrigate all of the lands in those valleys which could well lay claim to a share of it; but, owing to peculiarities of soil and excessive waste caused by lack of skill and indifference on the part of the irrigators, it does not do its duty of irrigating two hundred acres of land to each cubic foot of flow for four months, nor can it be expected to do this duty for many years unless the State regulates its use.

After explaining in detail the peculiar behavior of the different soils of the San Joaquin and Tulare Valleys, under irrigation, the lecturer said:

To resume—we have four classes of lands worthy of special mention as possessing marked peculiarities affecting the water supply necessary for their cultivation:

First—The delta lands of the Tulare Valley which at first take a great deal of water to irrigate them, but gradually become thoroughly saturated, and in the course of five years, perhaps may be irrigated with the minimum amount of water.

Second—The shallow soil plain lands which do not take nearly so much water to wet them at first, but—drying out quickly—each year afterwards require nearly as much as they did the first year, and always more than the delta lands do after they become well wetted once.

Third—The deep sandy soil plain lands which take an immense quantity at first, and always will take more than either of the two classes first mentioned, and the cultivation of which we need hardly hope will be accomplished with the standard allowance of water for many years to come.

Fourth—The deep soil alkaline adobes which the first year take, perhaps, as much as either of the others at one irrigation, but which may demand ever afterwards comparatively little at a time, but con-

stantly repeated applications late into each season while the crops are growing.

There are in the Tulare and San Joaquin Valleys four and a half to five million acres of lands which might be brought under irrigation if the water supply were sufficient. Not more than half of this area is well adapted to farming by irrigation, and fully one-fourth is decidedly not well suited. If the State should make an apportionment of her waters this fourth would demand its share.

During the past year the lecturer had made and caused to be made many observations upon the flow of the streams into these valleys from the Sierra, and was enabled to make very fair estimates of their volume in ordinary seasons as well as in the past exceptionally dry season.

The flow of all the streams from the Stanislaus to the Kern River, inclusive, was, during March, April, May, and June, of eighteen hundred and seventy-seven, equivalent to an average of twenty to twenty-one thousand cubic feet of water per second. In the ordinary season their volume averaged during the corresponding period about double the quantity. In the month of October of the past year but one thousand and twenty cubic feet of water per second were flowing from the mountains above ground in all the streams spoken of—not more than enough to fill one good-sized canal.

Although on the different soils the duty of this water will vary greatly, it might be expected to irrigate, on the average, per cubic foot, per second, flowing for four months, first year, thirty acres; fifth year, one hundred acres; tenth year, one hundred and sixty acres; fifteenth year, one hundred and eighty acres; twentieth year, two hundred acres. The porous qualities of soil are not alone to blame for this deficiency in duty of water, but the cultivators themselves are, and will be even more at fault. At the rate of two hundred acres per cubic foot, there was enough water in the streams to irrigate the four million acres of lands even in this dry year. But at the rate of thirty acres to the cubic foot, which is all we can expect for the first year, under the present conditions, there would not be, even in ordinary seasons, much more than enough to irrigate thirty per cent. of the irrigable lands.

Therefore, it seemed to the lecturer that the system of districting the irrigable lands of these valleys must be a progressive and not a predeterminedly rigid one. And the waters should be apportioned according to the duty they will do on the different soils, and such apportionments should be corrected annually, as the ground becomes filled up, and the duty may be increased.

Our population is deficient in number, and much wanting in skill necessary to prosecute irrigation to advantage. General irrigation in California must be preceded by general immigration. If the State forces one she must force the other. In the opinion of the lecturer the State should do everything in her power to straighten out the water-right and irrigation questions by establishing method, as far as possible, but should not guarantee interest on bonds of irrigation districts, for the reason that every possible district would immediately organize, want its bonds guaranteed, and if the State guaranteed for one she would have to do so for all. The result would be disastrous failure to produce out of the lands the values necessary to meet the demands upon them, for the very good reasons that much

of the land is not well suited for cultivation by irrigation; the water supply is insufficient to bring all of this land under cultivation for years to come; the population is not here, could not be brought here and endowed with the necessary skill and industry to prevent the failure.

Irrigation must grow a gradual and a healthy growth. Great works do not make successful irrigation enterprise.

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